from sunset to the minimum of the following morning is but a small part of the total range, and the fall from 9 p. m. until the following minimum is still less. Those who wish, from observations taken at 9 p. m., to determine the probability that freezing temperatures will occur next morning may be guided by the following table which shows:

1. The greatest fall recorded at Riverside between 9 p. m. and the following minimum.
2. The number of times the fall was 10° F. or more.
3. The number of times the fall was 5° or less.
4. The lowest minimum temperature.

The temperatures recorded by thermometers depend so much upon their exposure that it is best for each agriculturist to keep a record of his own thermometer and not depend too much upon those of distant neighbors. A station on a hillside will show generally smaller ranges than one in a low level valley.

Month.	1	2	3	4
	°	°	°	°
1894, November	15	13	5	32
December	13	5	13	29
1895, January	15	10	14	27
February	25	9	8	30
March	13	7	9	33
April	17	8	12	38
May	18	8	14	42
June	19	18	4	42
July	15	12	4	50
August	15	17	2	50
September	23	19	3	43
October	23	13	4	39
November	13	13	2	29
December	19	11	2	22

In preparing this table no account is taken of an occcasional gap in the continuity of the record, due to the omission of a morning or evening observation. On two occasions, February 11 and December 17, the morning minimum was higher than the 9 p. m. observation, and in many cases, scattered rather evenly throughout the months December to May, the minimum was sensibly the same as the preceding 9 p. m. temperature. It would seem as though the rate of cooling after 9 p. m. must depend entirely upon the clearness of the sky and the wind. If, as is usually the case, there be no wind, then the clearness, that is to say, the formation of fog, haze, or cloud must control the temperature, and as this clearness depends upon the moisture in the air, it would seem that horticulturists could make good use of some form of hygrometer in connection with their thermometers, unless the aspect of the sky suffices.

BLIZZARDS AND SCHOOLS.

A letter from Mr. Oliver Gibbs, Jr., of Ramsey, S. Dak., is published in the current number of Northwest Weather Crops, published by the Minnesota State Service. He calls attention to the fact that—

The blizzard always comes on a day that opens mild and cloudy, like a "down-east" January thaw. On such days, any time in the winter, it is the safest thing to watch out and stay close at home. Keep an eye on the thermometer, and if it turns suddenly cold and the mercury begins to fall rapidly, have everything safe and snug and a line strung from house to barn as soon as the north wind gives warning.

School teachers in country districts should have an understanding with the directors and the pupils that on such days there will be no school. Many lives were probably saved in this town in 1888 by not opening the schoolhouses on the day of that year's blizzard, though the morning was mild and inviting everybody out by the softness of the air.

To put it in another form, the blizzard and the tornado are both immediately preceded by a hot blast of air.

SNOW ROLLERS.

The phenomenon of snow rollers was observed by the passengers on the Flint River division of the Flint and Pere Marquette Railroad on December 10. They report that in large level fields hundreds of snow balls, some of them of colossal size, were rolled together by the action of the wind. The fields were covered with them.

A similar phenomenon is reported from Spokane, Wash. The Spokesman Review, of December 23, published at that place, says:

The wind has been playing strange with the snow in the vicinity of the waterworks on both sides of the river during the last few days, producing hundreds of snow cylinders of uniform size and as perfectly formed as though they had been cast in a mould.

These cylinders are from 12 to 16 inches long and from 6 to 10 inches in diameter, and are hollow, except in the middle. The hollow in each end is funnel-shaped, being widest at the end where the cylinder is quite thin, growing smaller as it nears the middle where there is a solid space. E. E. Alexander, whose farm is near the waterworks on the south side of the river, says there are hundreds of these cylinders near his place and also in the neighborhood of Minnehaha Park.

"It is a strange and beautiful spectacle," said Mr. Alexander yesterday, "and I never saw anything of the kind before. I judge that the conditions under which these cylinders are formed are exceedingly rare. Most of them seem to have been formed Thursday night. For a time the wind blew from the southeast, then it suddenly changed to the southwest, and where there were fence posts or inequalities in the ground these drifts were broken into small sections, which the wind gathered up and started to rolling. The snow was just soft enough to ball, and as these little masses were pushed slowly along by the wind they began to roll, gathering more snow as they went, till the cylinders were formed. They rolled all the way from 20 to 100 feet, and looked like things of life as they sped along until stopped by their own weight. They could only roll about so far, when they became so heavy that the wind would no longer move them, and this accounts for their uniform size."

MOTION OF THUNDERSTORMS AGAINST THE WIND.

The voluntary observer, Mr. A. E. Ackworth, of Mardela Springs, Wicomico County, Md., writes as follows:

The phenomenon of a cloud rising against the wind is a common one in this section when the cloud forms in the northwest with a surface wind blowing from southeast, moderate to fresh. It is chiefly confined to the afternoon, and has all the phenomena so well described in the WEATHER REVIEW for October last by Mr. Bruner.

Another peculiarity of these storms is that they rarely *come up against the tide*, and are almost entirely confined to those of northwest, rarely north and never from northeast unless formed by the junction of the two branches of a cloud that has formed and split at southwest; one part going by west and north to northeast, the other by south and east to northeast.

Another peculiarity is that whatever course the first thunderstorm of the year takes will be that of a majority of them.

In this section the southwest seems the main point of their formation. Yet a cloud forming southeast and coming over from the east is attended by the heaviest rainfall.

METEOROLOGICAL TABLES.

By A. J. HENRY, Chief of Division of Records and Meteorological Data.

For text descriptive of these tables see p. 427.